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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,520	10/16/2003	Vladimir Kochergin	340-80	4900

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EXAMINER	
KIANNI, KAVEH C	

ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/686,520	KOCHERGIN ET AL.
	Examiner	Art Unit
	Kianni C. Kaveh	2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2005 and 16 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *8-10,15,17,18,21,23,24,31-34,38-41,44-46 and 49-59* is/are allowed.

6)☒ Claim(s) *1-7,11-14,16,19,20,22,25-28,35-37,42,43,47,60 and 61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 November 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicant's **Supplemental amended** drawings **Figures 15-18** submitted on ***1/16/2006*** is accepted by the examiner.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, tapered waveguides as in **claims 29-30** must be shown or **the feature(s) canceled from the claim(s)**. No new matter should be entered.

The new drawings **Figures 19-21**, submitted on ***11/08/2005***, present new matters that were not shown in previous Drawings and therefore **they are not entered/accepted** by the Examiner—the newly submitted drawings were analyzed and discussed between the Examiner and a USPTO official, expert in the field.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application

must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification (Supplemental Amendment 1/16/2006)

The specification, newly submitted paragraphs ***1/16/2006***, is objected to because of the following informalities:

In accordance with 37 CFR 1.530(d)(1), all paragraphs which are added to the specification must be submitted as completely underlined.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the

examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1-7, 11-14, 16, 19, 20, 22, 25-28, 42-43, 47, 60 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scherer et at., U.S. Patent 6,711,200. Regarding independent claim 1 claimed, Scherer et al. teach a spectral filter for filtering or transmitting at least one predetermined spectral wavelength band comprising: a substrate or host wafer having first and second surface (Fig 2, left and right side) and further including plural, substantially uniform parallel uncoupled waveguides defined at least partially therethrough (see at least col. 2, 4th parag. and col 5, lines 43-48 and Fig 1, ref sign 10 and Fig 2, labeled waveguide), the plural waveguides defining axes substantially perpendicular to the wafer surface (see at least Fig 2-6, and 20 ref waveguide(s) being perpendicular to wafer surface(s)), the plural waveguides having coherently modulated cross sections along at least some part of the length of said waveguides (at least Fig 3-6 and 20 since holes are surrounding the waveguide), the plural waveguides supporting at least one waveguide mode at the predetermined spectral wavelength (see at least abstract and col. 7, last parag.-col. 8, 1st parag.; Also col. 2, 4th parag., col. 5, 4th parag. and col. 12, 4th parag,).

Regarding independent claim 6, in addition to the above limitations, the host wafer partially comprises porous semiconductor material (col 12, lines 60-65 since silicon can also be used), said semiconductor material remaining between the pores serving as waveguides while said pores separate neighboring waveguides (Fig 2, ref sign 32) and the porous semiconductor material is chosen from the alloys and

compounds of zinc, cadmium, mercury, silicon, germanium, tin lead, aluminum, gallium, indium, bismuth nitrogen, oxygen, phosphorous, arsenic, antimony, sulfur, selenium and tellurium (Fig 2, see InP substrate or col 4, lines 42-45).

Regarding independent claim 16, in addition to the above limitations, the waveguides are spatially ordered since there can be plural waveguides as described above.

Regarding claim 19, the waveguides can be disposed such that the waveguide pattern has a complex order with complex symmetry since there can be plural waveguides as described above and the waveguides can connect adjacent devices (col 5, lines 43-48).

Regarding independent claim 20, in addition to the above limitations, the pores are circular (Fig 3).

Regarding independent claim 22, in addition to the above limitations, the waveguides are made to exhibit a modulated lateral cross section over at least some of the length of waveguide for the reasons described above.

Regarding independent claim 60, in addition to the above limitations, the filter is disposed contiguous with an optical detection means (col 11, lines 23-25).

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Regarding independent claim 61, in addition to the above limitations, the mode is supported in the green or longer wavelength (col 4, lines 24-27).

Regarding claims 2 – 3, 42 – 43 and 47 the host wafer at least partially comprises porous semiconductor material (col 12, lines 60-65 since silicon can also be used) and

is macroporous, said semiconductor material remaining between circular pores serving as waveguides while said pores separate neighboring waveguides (Fig 2, ref sign 32).

Regarding claims 4-5, Indium Phosphide can also be used or porous gallium arsenide (GaAs) can be used (col 4, lines 42-45).

Regarding the independent claim 7, in addition to the above limitations, the thickness is from about 1 to 5000 times a characteristic lateral dimension of the waveguide (Fig 2) since the lateral dimension can be thought of as the thickness of the bracket and the thickness can be though of as the thickness (into the paper).

Regarding claims 11-14, in addition to the above limitations, the filter comprises a transmission band-pass filter, transmission band-blocking filter, reflection band-pass filter and reflection band blocking filters (col 7, lines 47-49).

Regarding claim 25, the modulation is made in the apodized form (Fig 2).

Regarding claim 26, the waveguides have more than one length segment of contiguous modulations along their depth separated by unmodulated segments (Fig 2) since the holes are along the length.

Regarding claim 27, there is a 180 degree phase shift since the holes are in a line.

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Regarding claim 28, the length segments of modulation are of different periods since there are different hole diameters (See Fig 3).

Claims 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scherer et at., U.S. Patent 6,711,200 in view of Wickham, et al., U.S. Patent 6,301,421.

Regarding independent claim 1 claimed, Scherer et al. teach a spectral filter for filtering or transmitting at least one predetermined spectral wavelength band comprising: a substrate or host wafer having first and second surface (Fig 2, left and right side) and further including plural, substantially uniform parallel uncoupled waveguides defined at least partially therethrough (col 5, lines 43-48 and Fig 1, ref sign 10 and Fig 2, labeled waveguide), the plural waveguides defining axes substantially perpendicular to the wafer surface (Fig 2, ref waveguide which is horizontal and thus perpendicular to the left and right surfaces), the plural waveguides having coherently modulated cross sections along at least some part of the length of said waveguides (Fig 3 since holes are surrounding the waveguide), the plural waveguides supporting at least one waveguide mode at the predetermined spectral wavelength (col, 7, lines 64-67).

However, the reference is silent with respect to an antireflective structure coating at least one surface of the host wafer, minimizing reflection of light from the waveguide material over the predetermined wavelength range such that at least some portion of each waveguide length is left uncoated by the antireflective structure.

Wickham teaches an antireflective structure coating at least one surface of a host wafer (Fig 3, ref sign ov), minimizing reflection of light from the waveguide material over the predetermined wavelength range such that at least some portion of each waveguide length is left uncoated by the antireflective structure.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to coat at least one surface of the host wafer, minimizing reflection of light from the waveguide material over the predetermined wavelength range such that at least some portion of each waveguide length is left uncoated by the antireflective structure.

The motivation is to allow modes to propagate after a single pass (col 3, lines 42-43).

Regarding clams 36-37, the antireflection structure can comprise one or more layers (col 3, lines 43-46).

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 15, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the waveguides are placed part by a distance in the range of 0.5 to 30 microns, the distance being greater than the smallest lateral dimension of the waveguide in combination with the rest of the limitations of the base claim.

Regarding claim 17, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the waveguides are spatially ordered in symmetry, which is hexagonal in combination with the rest of the limitations of the base claim.

Regarding claim 18, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the waveguides are spatially ordered in symmetry, which is cubic in combination with the rest of the limitations of the base claim.

Regarding claim 21, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the pores are approximately square in cross-section in combination with the rest of the limitations of the base claim.

Regarding claim 23, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the modulation is periodical with the period from about 50nm to about 20 microns in combination with the rest of the limitations of the base claim.

Regarding claim 24, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the modulation is the superposition of two or more periodical modulations with the period from about 50nm to about 20 microns each in combination with the rest of the limitations of the base claim.

Regarding claims 29, the prior art of record, taken alone or in combination, fails to disclose or render obvious waveguides are tapered in combination with the rest of the limitations of the base claim.

Claim 30 depends upon claim 29.

Regarding claims 44, the prior art of record, taken alone or in combination, fails to disclose or render obvious at least one layer of substantially transparent material in the transparency wavelength range of the spectral filter coating the pore walls in combination with the rest of the limitations of the base claim.

Claims 45-46 depend upon claim 44.

Regarding claim 48, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the pores are approximately square in cross-section in combination with the rest of the limitations of the base claim.

Regarding claim 49, the prior art of record, taken alone or in combination, fails to disclose or render obvious at least one layer of substantially absorbing or reflecting material disposed on at least part of the pore length and the material is chosen to minimize the cross-coupling between the modes of neighboring waveguides in combination with the rest of the limitations of the base claim.

Claims 50-52 depend upon claim 49.

Regarding claim 8, the prior art of record, taken alone or in combination, fails to disclose or render obvious at least one layer of substantially transparent material at the transparency wavelength range of the spectral filter coating the pore walls in combination with the rest of the limitations of the base claim.

Regarding claim 31, the prior art of record, taken alone or in combination, fails to disclose or render obvious at least one layer of substantially absorbing or reflecting material disposed on at least part of the pore length and the material is chosen to minimize the cross-coupling between the modes of neighboring waveguides in combination with the rest of the limitations of the base claim.

Regarding claim 38, the prior art of record, taken alone or in combination, fails to disclose or render obvious where the wafer is disposed between two plates of material transparent in a predetermined spectral range in combination with the rest of the limitations of the base claim.

Regarding claim 53, the prior art of record, taken alone or in combination, fails to disclose or render obvious the host wafer with the holes completely filled with substantially transparent material, said filled pores comprising cores of the waveguides and the semiconductor material between the pores functioning to separate neighboring waveguides in combination with the rest of the limitations of the base claim.
Claims 9-10; 32-34; 39-41; and 54-59 depend on claims 8, 31, 38 and 53 respectively and therefore they are also allowable.

Response to Arguments and Amendment

Applicant's argument filed on 11/08/05 have been fully considered but they are not persuasive.

Applicant alleges (page 25) that Scherer does not teach filtering. Examiner responds that such limitation is at least shown in Fig. 11 and see its relevant parag.

Applicant alleges (page 25 and 28) that Scherer does not teach surfaces. Examiner responds that such limitations are clearly shown in at least fig. 1 and 23 with having edge side surfaces along top and bottom surfaces.

Applicant asserts (page 24 and 27) that Scherer does not describe plural, parallel or uncoupled waveguides. Examiner responds that such limitations discussed in at least abstract and in col. 7, 3rd parag. that are related to figures 1-7 in which waveguides are constructed along cavities to transmit light onto elements associated with/within the crystal substrate/wafer.

Applicant also argues (pages 24-27) that the mode structure of applicant is different than that of Scherer. Examiner agrees with applicant however, responds that first Scherer has may embodiments that discusses waveguide propagation mode/modes filed(s), nevertheless, the applicant needs to narrow appropriately the claimed limitation(s) in order to distinguish its teachings with that of the Prior Art teachings.

THIS ACTION IS MADE FINAL

This action in response to applicant's amendment made FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

- The Examiner, as stated to Mr. Faris, on 1/18/2006, the Applicant needs to narrow appropriately the claimed limitation(s) in order to distinguish its teachings with that of the Prior Art teachings.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kianni C. Kaveh whose telephone number is 571-272-2417. The examiner can normally be reached on 9:30-19:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PRIMARY EXAMINER

K. Cyrus Kianni
Primary Patent Examiner
Group Art Unit 2883

KAVEH KIANNI
PRIMARY EXAMINER

January 20, 2006